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THE REGIONAL MUNICIPALITY
OF
HAMILTON-WENTWORTH

JAN 28 1981

L GLANBROOK LANDFILL SITE

LANDFILL DESIGN AND SITE OPERATION

ADDENDUM

TO

REPORT DATED JULY 1978

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Project E0 77182

Mr. C.T.C. Armstrong, Chairman
Steering Committee
c/o Office of the Co-ordinator
The Regional Municipality of Hamilton-Wentworth
38th Floor, Century 21
100 Main Street East
HAMILTON, Ontario
L8N 3V9

Dear Sir

Glanbrook Landfill Site
Landfill Design and Site Operation

We enclose herewith an addendum to our original report on the Landfill Design and Site Operation dated July 1978. This addendum clarifies some of the points raised at the recent meeting with officials from the Ministry of the Environment. Some of these points were also raised at the Ontario Municipal Board hearing and were explained in detail at that time.

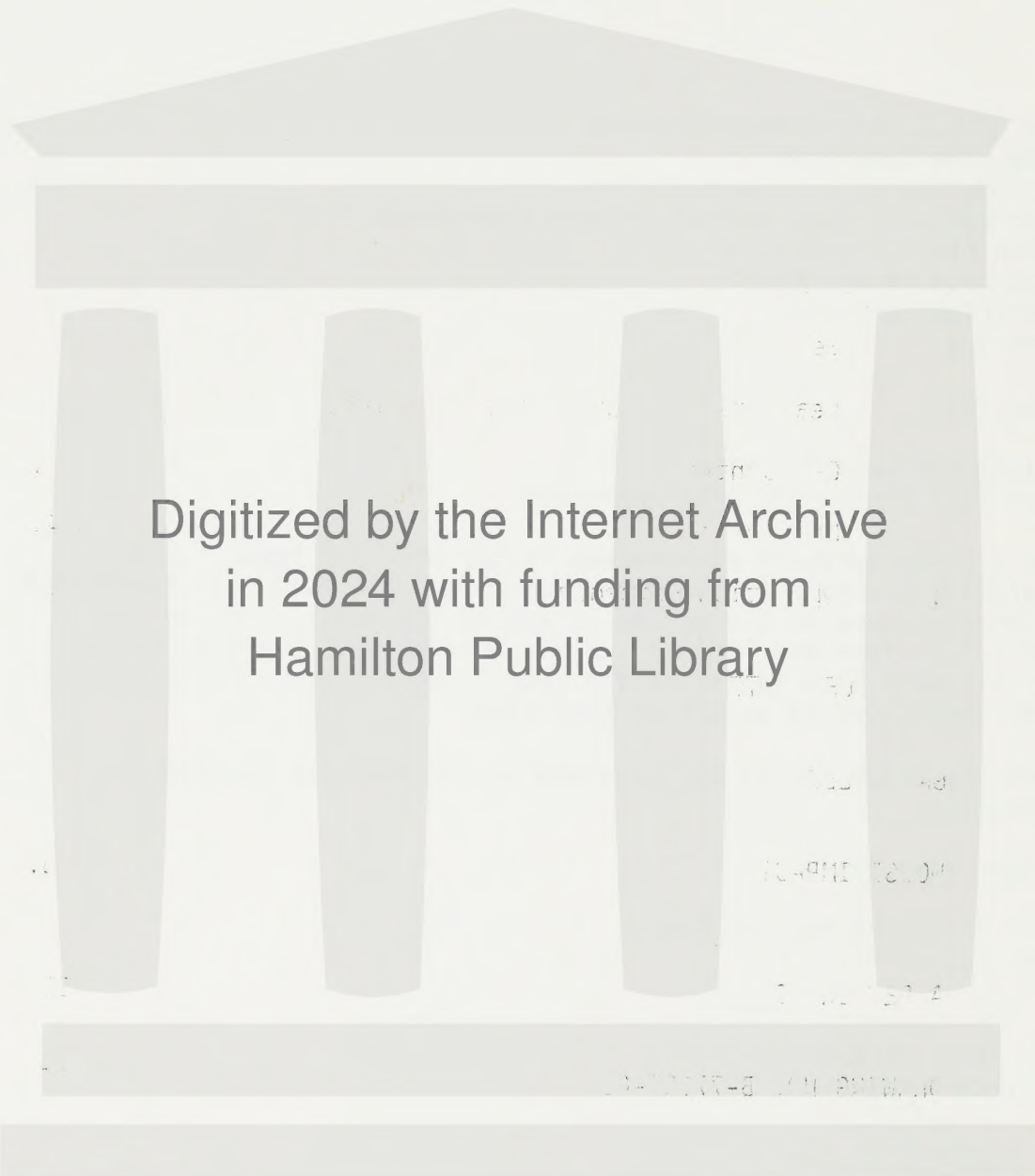
This addendum should be forwarded to the Ministry as soon as possible.

Yours very truly

The Proctor & Redfern Group

R. Tait, P. Eng.
Branch Manager

W. D. Goodings, P. Eng.
Manager, Branch Operations



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1.0 INTRODUCTION

The purpose of this Addendum is to clarify certain items in the original Landfill Design and Site Operation report dated July 1978 and also to clarify other items raised by the officials of the Ministry of the Environment in their recent review of all of the technical reports submitted.

This addendum should be read in conjunction with the eight reports listed under e) Technical Reports on Pages 35 and 36 of the Synthesis Report on the Solid Waste Management System dated July 1978 and also in conjunction with the recent Addendum to the Hydrogeological Study prepared by Gartner Lee Associates Limited.

Most of the following points were brought out and explained during the recent Ontario Municipal Board Hearing.

We understand that the staff of the Ministry of the Environment who have reviewed all of the reports generally concur with the proposals and recommendations outlined in the reports.

2.0 LANDFILL DESIGN AND SITE OPERATIONS

2.1 GENERAL

The question of respective responsibility of the Region and Tricil Limited with regard to the operation and monitoring of the site was raised at the recent Ontario Municipal Board hearing and has also been raised by the staff at the Ministry.

The Full Service Solid Waste Management Agreement between the Regional Municipality of Hamilton-Wentworth and Tricil Limited clearly sets out the responsibility of the Region and Tricil with regard to the work to be performed at the landfill site by each party to the Agreement. This is covered under the following sections of the Agreement: -

Article III	Work to be Performed
Article IX	Glanbrook Landfill Site
Article X	General Conduct of Facilities
Schedule 15B	Glanbrook Landfill Site Lease
Schedule 16	Glanbrook Works and Services: Region
Schedule 17	Glanbrook Plans and Services: Tricil

The Region will own the landfill site. The site will be leased to Tricil for a ten year period under the terms of the Agreement.

2.0 LABORATORY TESTS AND FIELD OBSERVATIONS

2.1 Summary

The data from the laboratory tests and field observations are presented in this section. The laboratory tests were conducted to determine the physical properties of the material and the field observations were conducted to determine the behavior of the material in the field. The laboratory tests were conducted in the form of compression tests, tensile tests, and shear tests. The field observations were conducted in the form of visual inspections, measurements, and tests. The results of the laboratory tests and field observations are presented in the following sections.

The laboratory tests were conducted to determine the physical properties of the material. The compression tests were conducted to determine the compressive strength of the material. The tensile tests were conducted to determine the tensile strength of the material. The shear tests were conducted to determine the shear strength of the material. The results of the laboratory tests are presented in the following sections.

The field observations were conducted to determine the behavior of the material in the field. The visual inspections were conducted to determine the appearance of the material. The measurements were conducted to determine the dimensions of the material. The tests were conducted to determine the behavior of the material under various conditions. The results of the field observations are presented in the following sections.

The results of the laboratory tests and field observations are presented in the following sections. The results of the laboratory tests are presented in the form of tables and graphs. The results of the field observations are presented in the form of text and photographs.

2.2 LEACHATE COLLECTION AND TREATMENT

The landfill collection system will be designed by the Region and installed by Tricil. The leachate collection system will then be operated by Tricil. The Region will remain responsible for the operation and maintenance of the leachate system after the termination of the Tricil Limited contract and will also be responsible for any off-site trucking or treatment of leachate.

As noted in the original report the leachate generated is not likely sufficient in volume to warrant removal until after the 15th year of operation. Leachate will be allowed to build to the ground water mounding profile as indicated on the hydrogeological detail on Drawing No. L5 in the Report. Prior to that time a plan will be developed to remove the leachate for off-site treatment by means of trucking or forcemain discharge to the closest sanitary sewer system for treatment at the Woodward Avenue Sewage Treatment Plant. This treatment plant and the sanitary sewer system are all under the direct control of the Region.

The landfill site is expected to last a considerable period of time provided that the Region maintain its commitment to recover wastes in the solid waste stream through the operation of SWARU and the implementation of the resource recovery requirements of the Full Service Agreement. Without SWARU and based on the current estimates of waste generation, the site will be filled within 9½ years.

The chart attached as Appendix I (one of the exhibits at the recent Ontario Municipal Board hearing) suggests that under certain cir-

cumstances it is possible that the site will last beyond year 2000.

Because of these two extremes it is not possible to accurately calculate the amount of infiltration and hence the time when leachate must be dealt with off-site.

2.3 GAS CONTROL

The gas control system has not been presented in great detail at this time. The gas will be monitored on the completion of the first major cell. The gas monitoring technique as shown on Drawing No. L5 in the original Report is in accordance with the Waste Management Branch Report EAS 4-EC-77-4 prepared by Fisheries and Environment Canada.

It is anticipated that gas ventilation will occur naturally through minor fissures in the clayey cover which will tend to dessicate in the well drained condition expected to exist on the surface of the completed landfill.

2.4 MONITORING

The Region will arrange for all necessary monitoring on the site. A detailed program will be developed in conjunction with the Ministry of the Environment after the site is approved. This will include the keeping of all required records.

The river water quality should also be monitored downstream and upstream of the site. The Ministry of the Environment should carry out this monitoring.

2.5 OPERATION PROCEDURE

Any leachate springs or short circuiting of leachate to surface waters will be controlled by providing good hydraulic connection between daily cells. A portion of the previous day's cover will be broken with the landfilling equipment prior to placing new garbage. This will prevent leachate springs from occurring at any point above the ground level. In addition the leachate collection system will be monitored and controlled so that leachate does not rise above the desired levels. The site will also have perimeter surface drains leading to storm water retention ponds so that any escape of leachate will be caught and controlled.

3.0 TYPES OF WASTE

Wastes to be handled by Tricil are defined under Article 1, Section 1.01, Paragraphs (a), (b), and (c) of the Full Service Agreement.

Included in the "Acceptable Landfill Waste" will be catchbasin sludge and other municipally generated wastes including treated sewage sludge from Woodward Avenue sewage treatment plant only in the event of a breakdown of the incinerator at that plant and ash from SWARU.

No liquid industrial waste will be deposited in the Glanbrook site.

The Region will provide weigh scales at SWARU and the three transfer stations. Detailed records will be maintained. In addition Tricil will maintain records of the material transferred to the landfill site including the ash from SWARU.

4.0 GAS WELLS

Extensive research has been completed on the location of all existing gas wells on the properties to be acquired. These wells are shown on Drawing No. G10 which is attached to this report. You will note that there is only one gas well within the working area of the site. This well is presently plugged with pine plugs and clay. This gas well will be cleaned and plugged with cement in accordance with the appropriate regulations of the Ministry of Natural Resources.

The following information is provided for the purpose of the study. It is not intended to be a comprehensive review of the literature, but rather a summary of the key findings.

The study was designed to investigate the relationship between the variables. The results of the study are presented in the following table. The data were collected from a sample of 100 subjects.

The results of the study are presented in the following table. The data were collected from a sample of 100 subjects.

The provision of services is a key factor in the success of the program. The results of the study are presented in the following table. The data were collected from a sample of 100 subjects.

In view of the above, it is recommended that the following measures be taken to improve the effectiveness of the program. The results of the study are presented in the following table.

5.0 NOISE IMPACT

The officials of the Ministry have now finished a review of the Noise Impact Analysis in conjunction with the landfill Design and Operation Report and the Landscape Architecture Report.

The Ministry's Noise Pollution Control Section have concluded that: -

- "1. The proposal of the Glanbrook Landfill Project does not present major noise impact to the residential environment and will not create minor noise impact most of the time.
2. The proposal if put in effect as stated, could result in a minor noise impact for residences on the north side for days or weeks at a time, during specific operations at the nearest cells.
3. Berming may be utilized to eliminate even this minor noise impact. This possibility was pointed out in early July 1978 but not incorporated in the report issued in the same month. Consideration for the berming is needed to meet the full design requirements at all times of the operation.
4. The proposal incorporated well thought out and desirable landscaping features, but the acoustical analysis of its installation and of the initial construction of the nearest cells at the north side is missing from the reports. The completion of such analysis would provide a handle on avoiding early sources of complaints and annoyances."

The provision of berms round the houses on the north side of the site was reviewed in detail during the preparation of the original Landfill Design Report, the Landscape Architecture Report and the Noise Impact Analysis Report.

In view of the comments from the Ministry we have again reviewed the question of the provision of these berms.

3. A review of the literature on the effects of noise on the human ear and the effects of noise on the human body. The review is based on a search of the literature from 1960 to 1970. The review is organized into two main sections: (a) the effects of noise on the human ear and (b) the effects of noise on the human body. The review is based on a search of the literature from 1960 to 1970. The review is organized into two main sections: (a) the effects of noise on the human ear and (b) the effects of noise on the human body.
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5. The effects of noise on the human body. The effects of noise on the human body are discussed in terms of the effects of noise on the body's ability to function and on the body's ability to protect itself from noise. The effects of noise on the human body are discussed in terms of the effects of noise on the body's ability to function and on the body's ability to protect itself from noise.

We have concluded that: -

1. Only three homes along the north side of the site will be affected by this minor noise impact. This impact will only be apparent when work is being carried out in the area closest to the homes. This will be for only a limited period of time and will be in approximately 10 years time.
2. We agree with the Ministry that the provision of berms round these houses would reduce this noise impact.
3. A review of the existing and proposed contours show that these berms would have to be approximately thirty-five feet high and would have to be built relatively close to the affected properties to be of any significant benefit. There is an existing creek in the area where the berms should have to be built. This creek would have to be relocated or carried through the berms by means of culverts.
4. The berms would have to be constructed at the start of the project so that the appropriate landscaping could also be completed and given a chance to grow prior to any landfilling in the area.
5. The construction of the berms will have a noise impact on the three affected residences and also on the other residences on the opposite side of the road. This noise impact may be as bad as or greater than that caused by the landfill operation. The noise impact due to the construction of the berms will also be greater than the noise impact caused by the installation of the landscaping.

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forest of the district.

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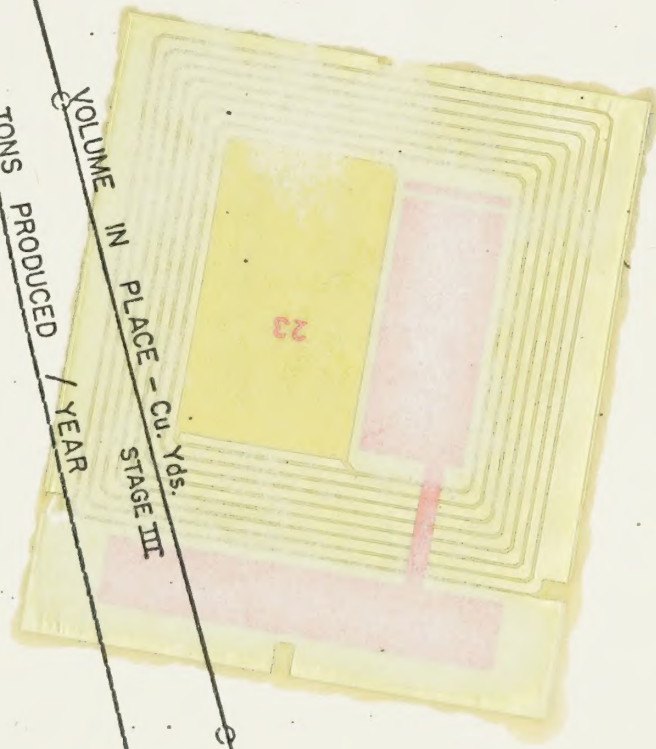
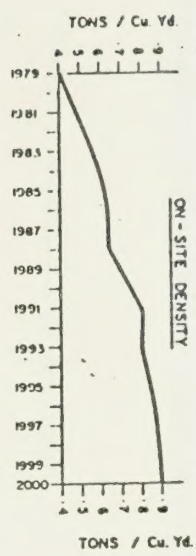
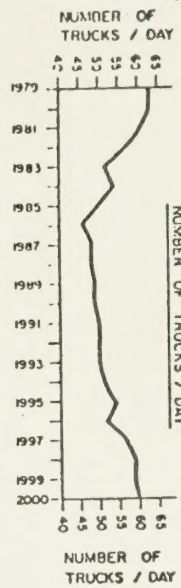
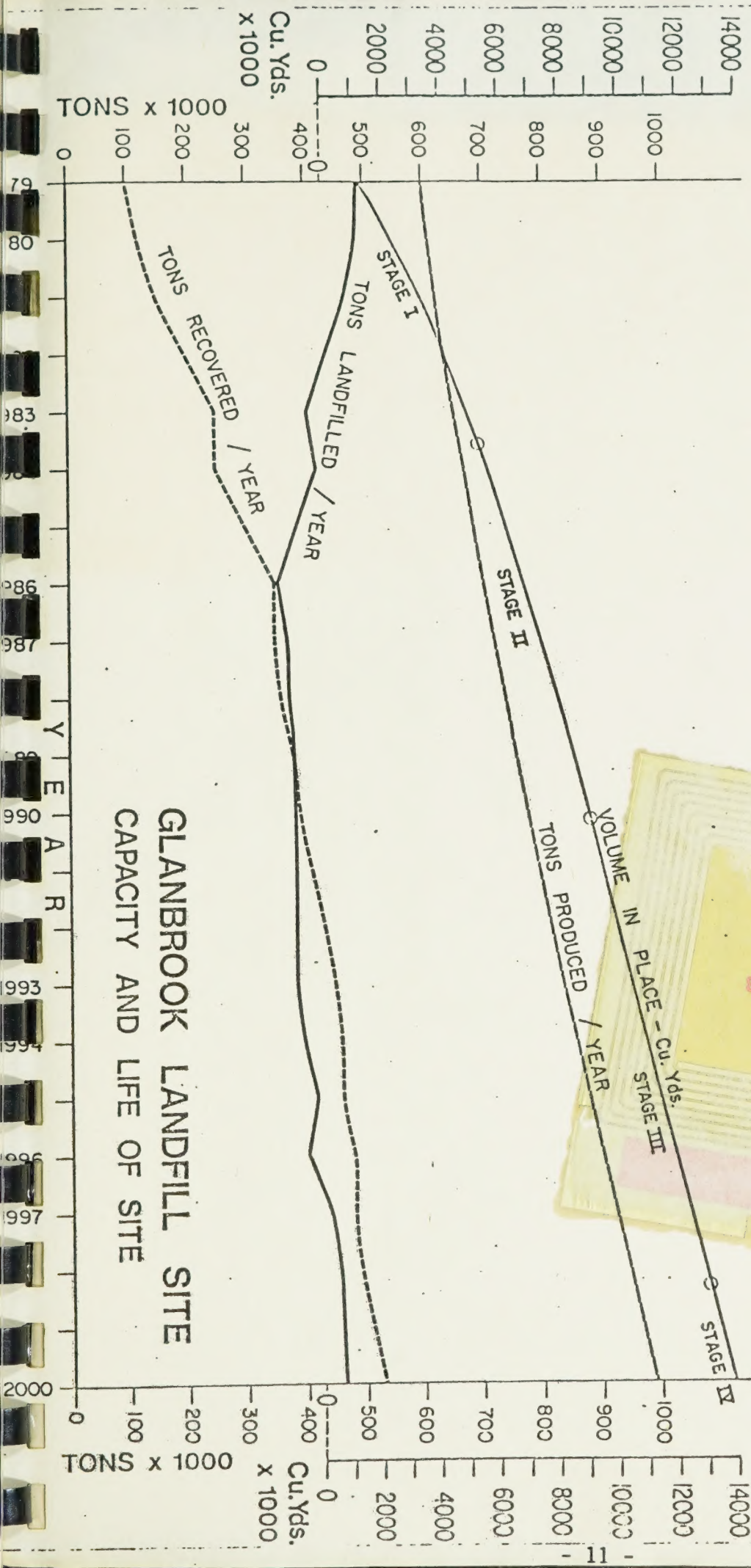
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6. The construction of the berms will have a visual impact on all houses in the area. The intent of the landscaping proposal was to reduce the visual impact of the proposed site.
7. The construction of the berms at the start of the project will effectively reduce the area of land that could stay in agricultural use and will also impact on the areas from which the fill material is borrowed.
8. The individuals who live on Hall Road East and who attended the 'open house' meetings in Binbrook appeared to prefer the proposed landscaping concept to the construction of berms.
9. The cost of construction of berms will be significant in relation to the relief from the minor impact on the three affected residences. These monies might be more effectively used to resolve the situation in other ways.

In conclusion we recommend that no changes be made to the Landfill Design and Landscape Architecture Reports at this time. The question of noise impact on the affected residences can be reviewed by the Environmental Assessment Board.

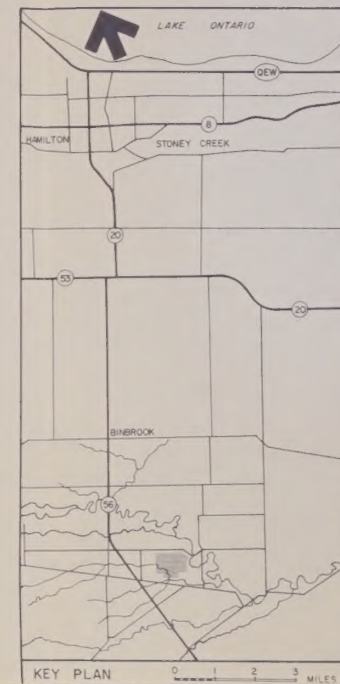
CHARACTERISTICS AND USES OF SILK GYMNEBROOK TWILIGHT 1915





CAPACITY AND LIFE OF SITE GLANBROOK LINDHILL SITE





LEGEND
☆ PRODUCTION GAS WELL
★ ABANDONED GAS WELL

WELL No.	TYPE OF WELL	DATE DRILLED	DATE PLUGGED	GAS WELL No.	CO-ORDINATES DRILLERS LOGS	CO-ORDINATES BOOK #	CON.	LOT
1	☆	May, 1971	—	Weinhardt 1	335' S of N 694' W of E		9	26
I	★	Aug, 1931		Continental 1	2500' S of N 400' W of E	700' N of S 450' W of E	9	28
II	★	Oct, 1931		Continental 2		1250' N of S 700' E of W	9	28
III	★	Nov, 1931		Continental 3	3680' S of N 550' W of E	500' N of S 300' W of E	9	27
IV	★	Dec., 1931		Continental	2340' S of N 940' W of E		9	27
V	★	1912		Dominion		1700' S of N 25' E of W	9	26
VI	★	1913	June, 1949	Dominion		50' N of S 1100' W of E	10	27

★ GEOLOGICAL SURVEY MEMOIRS 224
CANADIAN DEPARTMENT OF
MINES & RESOURCES 1940

NOTES:
1. The exact location of each Gas Well should be field checked.

SCALE: 1" = 400'

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DEPARTMENT OF ENGINEERING
GLANBROOK LANDFILL SITE
GAS WELL LOCATIONS

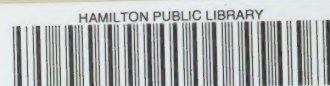


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ACCOUNT No. PROJECT No.
DATE: DECEMBER, 1978 Drawing No. B-77182-G10 Rev.

No.	REVISION	DATE	INITIAL



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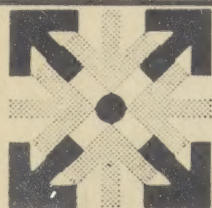
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	Continental 1	2500' S of N 400' W of E	700' N of S 450' W of E	9	28
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	Dominion		1700' S of N 25' E of W	9	26
ne, 1949	Dominion		50' N of S 1100' W of E	10	27

* GEOLOGICAL SURVEY MEMOIRS 224
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ACCOUNT No.

PROJECT No.

DATE : DECEMBER, 1978

Drawing No. B-77182-G10

Rev.